



# Decreasing Inappropriate Urine Testing to Decrease Catheter-Associated UTI: A Provider Behavior Approach

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## Background

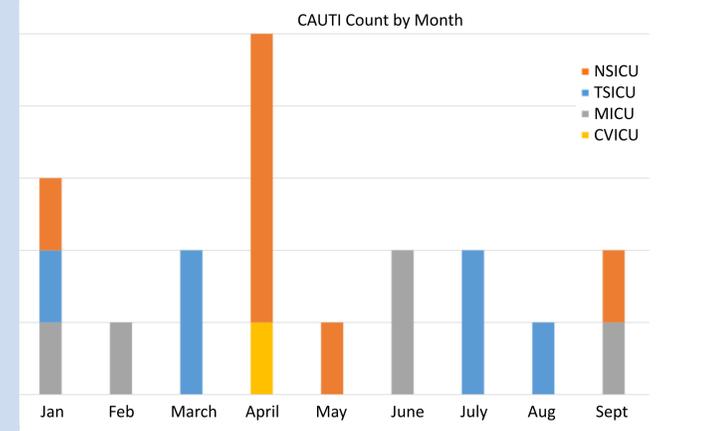
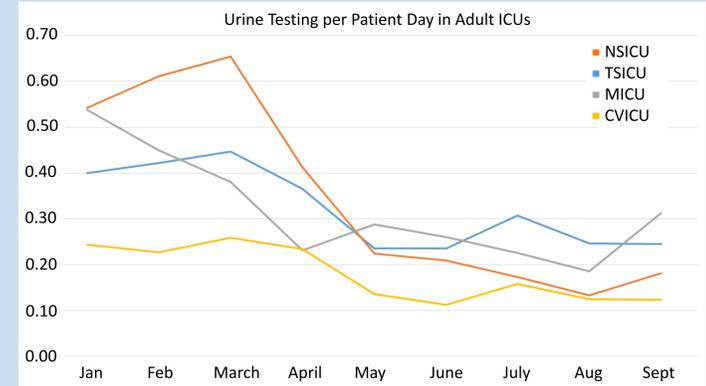
IDSA guidelines recommend ordering urine cultures based on signs and symptoms that are indicative of infection.\* Numerous studies have demonstrated urine cultures are sent at high frequency, without clinical indication, leading to unnecessary antimicrobial use. Inappropriate urine testing practices can inadvertently categorize catheter associated bacteriuria as a catheter associated urinary tract infection (CAUTI), per the NHSN surveillance definition. At our 550 bed acute care teaching hospital, we embarked on a proof-of-concept study to demonstrate that by reducing inappropriate urine testing and by ensuring consistent, guideline aligned collection techniques, we could decrease unnecessary identification of asymptomatic bacteriuria and rate of CAUTI.

## Objectives

- Primary-**
- To develop a guideline supported checklist of indications for urine testing to ensure clinically indicated testing
  - To develop a guideline supported standard work for specimen collection
  - To provide evidence that this strategy can reduce inappropriate urine testing and improve specimen collection in intensive care units
  - To provide evidence that this strategy can reduce CAUTI rates
- Secondary-**
- To demonstrate that cases of urosepsis are not missed due to use of the guideline driven testing strategy
  - To estimate savings in laboratory labor, costs, and patient financial charges
  - To assess if this emphasis leads to decrease in indwelling urinary catheter utilization

## Results

- Compliance with the paper checklist was low throughout all units
- The number of urine tests sent decreased per patient days for all units
- There were no contaminated specimens sent during the project, reported by the lab
- The number of CAUTI per units has decreased
- This process did not alter indwelling urinary catheter utilization
- The number of days without CAUTI per unit was extended beyond what any unit had accomplished in the past (i.e 190 days without a CAUTI in CVICU)
- All unit patients who demonstrated blood cultures positive with a uropathogen also had appropriate urine testing sent (no cases of urosepsis were missed due to lack of urine testing)
- There were significant lab savings in cost and time, as well as significant savings in patient charges



	Compliance with Urine Testing Checklist				Cost Savings		
	Medical ICU	Neurosciences ICU	Trauma/Surgical ICU	Cardiovascular ICU	Unit	Lab Savings	Patient Savings
June	43%	4.3%	10%	12.9%	CVICU	\$2,381	\$12,470
July	50%	9.1%	10%	5.4%	NSICU	\$5,513	\$29,546
August	33%	10.5%	4.65%	4%	MICU	\$2,690	\$14,522
Sept	3.8%	1.1%	0.72%	0%	TSICU	\$380	\$1,504

## Methods

### Behavior approach-

- Adult ICUs were recruited to initiate sign and symptom based urine testing, with requirement of checklist<sup>1</sup> completion prior to the urine test that could result in a culture being sent, as well as guideline based instructions on how to obtain a urine specimen correctly, to decrease contamination
- Adult ICUs were targeted, as they have the highest utilization of indwelling urinary catheters compared to the rest of the hospital<sup>2</sup> - Trauma/Surgical, Neurosciences, Medical and Cardiovascular ICUs
- Standard collection<sup>3</sup> and testing practices were implemented in April and May and have continued

### Feedback to units-

- Provided the ICU directors, nurse managers and quality improvement staff with weekly email on urine testing numbers and days since last CAUTI by unit
- Checklist compliance was reported in the month of September to units

**JOB BREAKDOWN SHEET**  
STDWK - Urine Sample Collection With a Urinary Catheter

MAJOR STEP	KEY POINTS	REASONS
<b>"WHAT" Urine sample is indicated: Prepare for procedure (LIP, nurse, CNA as delegated)</b>	<ol style="list-style-type: none"> <li>Identify if the urinary catheter has been in place for &gt; 2 weeks or if time is unknown               <ol style="list-style-type: none"> <li>If YES, request Epic order from LIP to change urinary catheter</li> <li>If ordered, change urinary catheter per nursing policy</li> <li>Use Standard Precautions</li> <li>Explain procedure to patient and family</li> </ol> </li> <li>Obtain supplies               <ol style="list-style-type: none"> <li>Alcohol wipes</li> <li>Specimen container or sterile capped syringe</li> <li>Personal protective equipment</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>Specimen contamination is greatly increased when the catheter has been in place for &gt; 2 weeks.</li> <li>If the catheter is still required, it should be replaced with a new catheter before obtaining specimen.</li> <li>If the catheter is no longer needed, it should be removed and a clean catch specimen obtained (see IS).</li> <li>If the catheter is still needed and present for &lt; 2 weeks, but a urinary tract infection is confirmed, the catheter can be changed to hasten symptom resolution.</li> </ul>
<b>"HOW" Procedure when urinary catheter is in place (LIP, registered nurse, or CNA as delegated)</b>	<ol style="list-style-type: none"> <li>Perform hand hygiene.</li> <li>Kink drainage tubing at a minimum of 3 inches below the specimen collection port until urine is visible under the access site. Note: The Bard E-2 Lock Sampling Port accepts a luer-lock or slip-tip syringe.</li> <li>Cleanse sampling port with alcohol; scrub for 15 seconds, allow to dry for 15 seconds.</li> </ol> <ol style="list-style-type: none"> <li>Attach sterile syringe to sampling port: Press the syringe firmly and twist gently to lock the syringe onto the sampling port.</li> <li>Aspirate desired volume of urine: 3 ml for culture and 10 ml for UA.</li> <li>Place sterile cap over syringe hub; unlink catheter tubing.</li> <li>Label syringe with patient label, date/time of collection and method of collection (urinary catheter or suprapubic catheter).</li> <li>Double bag specimen in Biohazard bag.</li> <li>Remove gloves and perform hand hygiene.</li> <li>Send specimen to lab within 15 minutes of collection.</li> <li>Document location of urine collection in the drop down menu in Epic when printing the specimen label.</li> </ol>	<ul style="list-style-type: none"> <li>To assure that an accurate diagnosis is made for the appropriate treatment to be provided to our patient.</li> <li>To ensure a sterile technique is used to obtain the urine specimen.</li> <li>To prevent specimen contamination.</li> <li>To assure the specimen reaches the laboratory in a timely manner in the appropriate container with the correct patient label for an accurate and timely culture.</li> <li>To provide accessible information to others about the care provided and the specimen obtained.</li> </ul>

**Inpatient Unit Table**  
Oct 2014 to Sep 2016

Inpatient Unit	Urinary Catheter Days	Patient Days	DU Ratio (device days/patient days)
TSICU	7453	10433	0.71
NSICU	5693	9578	0.59
MICU	4993	9030	0.54
CVICU	7528	15040	0.50
4A	4146	12251	0.34
9K	5048	15937	0.32
10K	6066	19589	0.31
13A	4148	13785	0.30
5B	735	2483	0.30
8NPI	2490	9748	0.26
14A	3326	13106	0.25
10A	2967	13343	0.22
13K	4045	20332	0.20
12C	1016	5717	0.18
14C	3328	21507	0.15
MBU	1716	12367	0.14
5AAcute	1729	13275	0.13
10N	1135	8764	0.13
5C	1090	8970	0.12
7CV	196	1791	0.10
9S	983	12738	0.08
10S	151	10814	0.01
1NW	4	510	0.01
9N	92	14938	0.01
Overall	73531	317761	0.23

1. PLACE PATIENT LABEL HERE DATE: \_\_\_\_\_

**UTI Workup for patient WITH Urinary Catheter (Foley present or removed <48h)**

Interview the patient: If the patient is not able to communicate, consider all possible reasons for their sign and/or symptoms. Patient must meet at least 1 of the following UTI criteria below. If patient does not meet any criteria below, UTI unlikely and sending a urine culture is not recommended

- New or worsening fevers (with no other identified cause)
- Rigors
- Altered mental status (with no other identified source)
- Flank pain
- Costovertebral angle tenderness
- Acute hematuria
- Pelvic discomfort

For patients without a catheter but who have had a Foley in the last 48 hours, consider CAUTI if they show S/S listed below

- Dysuria
- Frequency
- Urgency

**Urine color, sediment, odor are NOT reasons to consider a UTI**

- Specimen contamination is greatly increased when the catheter has been in place for > 2 weeks. Therefore, if the catheter is still required, it should be replaced with a new catheter before obtaining specimen. This will require an Epic order from LIP
- If the catheter is no longer needed, it should be removed and a clean catch or straight cath specimen obtained

**DOES PATIENT MEET CRITERIA FOR URINE CULTURE? YES OR NO**

## Conclusions

- Intervention led to a decrease in urine tests sent
- Number of CAUTI per month is trending downward post-intervention. More time is needed to assess significance of decrease
- The discussion of testing indications does influence urine testing. While compliance rates of checklist completion were low, we conclude that the decrease in testing was most likely due to the discussion of testing within teams, especially on daily rounds

### Future Directions

- Incorporate the principles of the checklist into the electronic health record
- Continue to discuss urine testing on daily rounds with both physicians in training and nursing staff to reinforce clinical indications for urine testing
- Expand intervention to all units for institution wide engagement
- Continue education on the standard work for urine testing and collection
- Assess the amount of reduced antimicrobial use due to decrease in inappropriate urine testing and possible prevented cases of antibiotic-associated *Clostridium difficile*

## References

\* Hooton et al. Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America Infectious Disease Society of America. Clinical Infectious Diseases. 2010; 50:625-663